Claims

1. A method for monitoring the neurological state of a patient, the method comprising the steps of:

(a) obtaining cortex-related biosignal data from the patient;

(b) obtaining subcortex-related biosignal data from the patient, the subcortex-related biosignal data including at least bioimpedance signal data;

(c) calculating a first indicator based on the cortex-related biosignal data, the first indicator being indicative of cortical activity in the patient;

(d) based on the subcortex-related biosignal data, calculating a set of indicators indicative of subcortical activity in the patient, the set of indicators including at least a second indicator calculated based on the bioimpedance signal data; and

(e) producing a composite indication based on the first indicator and on the set of indicators.

2. A method according to claim **1**, wherein:

- step (d) includes calculating the second indicator only; and

- step (e) includes producing the composite indication from the first indicator and the second indicator.

3. A method according to claim **1**, wherein

- step (b) includes obtaining ECG signal data from the patient;

- step (d) further includes calculating a third indicator based on the ECG signal data, the third indicator being indicative of heart rate of the patient; and

- step (e) includes producing the composite indication from the first, second, and third indicators.

4. A method according to claim **1**, wherein

- step (b) includes obtaining EMG signal data from the patient;

- step (d) further includes calculating a fourth indicator based on the EMG signal data, the fourth indicator being indicative of electromyographic activity in the patient; and

- step (e) includes producing the composite indication from the first, second, and fourth indicators.

5. A method according to claim **3**, wherein

- step (b) includes obtaining EMG signal data from the patient;

- step (d) further includes calculating a fourth indicator based on the EMG signal data, the fourth indicator being indicative of of electromyographic activity in the patient; and

- step (e) includes producing the composite indication from the first, second, third, and fourth indicators.

6. A method according to claim **1**, wherein step (d) includes obtaining a measure of the rate at which changes occur in the bioimpedance signal data as the second indicator.

7. A method according to claim **6**, wherein step (d) includes the steps of:

- deriving the bioimpedance signal data to obtain derivation signal data representing changes in the bioimpedance signal data;

- defining a threshold for the derivation signal data; and

- determining the rate at which the derivation signal data exceeds the threshold. __

8. A method according to claim **7**, further comprising a step of suppressing the range of the derivation signal data to obtain suppressed derivation signal data, wherein the threshold is defined for the suppressed derivation signal data.

9. A method according to claim **7**, further comprising a step of adapting the derivation signal data between a minimum and a maximum value to obtain adapted derivation signal data, wherein the threshold is defined for the adapted derivation signal data.

10. A method according to claim **7**, further comprising the steps of

- suppressing the range of the derivation signal data to obtain suppressed derivation signal data; and

- adapting the suppressed derivation signal data between a minimum

and a maximum value to obtain suppressed and adapted derivation signal data,

wherein the threshold is defined for the suppressed and adapted derivation signal data.

11. A method according to claim **1**, wherein the cortex-related biosignal data includes EEG signal data and step (c) includes obtaining a measure of the entropy of the EEG signal data as the first indicator.

12. A method according to claim **4**, wherein step (d) includes obtaining a measure of the power spectrum of the EMG signal data as the fourth indicator.

13. A method according to claim **1**, wherein the cortex-related biosignal data and the bioimpedance data are obtained through at least one sensor attached to the patient, the at least one sensor including at least one electrode used for obtaining both the cortex-related biosignal data and the bioimpedance data.

14. A method according to claim **13**, wherein steps (a) and (b) are performed simultaneously.

15. A method according to claim **14**, wherein step (a) includes obtaining a biopotential signal from the patient, step (b) includes supplying electric current at a first frequency to the patient to obtain the bioimpedance signal data, and step (a) further includes removing the first frequency from the biopotential signal.

16. A method according to claim **13**, wherein steps (a) and (b) are performed on a time division basis.

17. A method according to claim **1**, wherein the first indicator and the set of indicators are supplied as input data to a device for administering drugs.

18. An apparatus for monitoring the neurological state of a patient, the

apparatus comprising:

- means for obtaining cortex-related biosignal data from the patient;
- means for obtaining subcortex-related biosignal data from the patient, the subcortex-related biosignal data including at least bioimpedance signal data;
- means for analyzing the cortex-related biosignal data to obtain a first indicator indicative of cortex-related activity in the patient;
- means for analyzing the subcortex-related biosignal data to obtain a set of indicators indicative of subcortex-related activity in the patient, the set of indicators including at least a second indicator calculated based on the bioimpedance signal data; and
- means for producing a composite indication based on the first indicator and the set of indicators.

19. An apparatus according to claim **18**, wherein the means for obtaining the subcortex-related biosignal data consists of means for obtaining at least one bioimpedance signal from the patient, the at least one bioimpedance signal including the bioimpedance signal data.

20. An apparatus according to claim **18**, wherein the means for obtaining the subcortex-related biosignal data includes first measurement means for obtaining at least one bioimpedance signal and at least one biopotential signal from the patient, the at least one bioimpedance signal including the bioimpedance data, and the at least one biopotential signal including at least one type of signal data from a group including ECG signal data and EMG signal data.

21. An apparatus according to claim **18**, wherein the apparatus comprises a plurality of measurement electrodes of which at least one is common to the means for obtaining the cortex-related biosignal data and to the means for obtaining the subcortex-related biosignal data.

22. An apparatus according to claim **21**, wherein the means for obtaining the cortex-related biosignal data and the means for obtaining the subcortex-related biosignal data from the patient comprise four patient

electrodes totally.

23. An apparatus according to claim **18**, wherein the means for analyzing the cortex-related biosignal data and the means for analyzing the subcortex-related biosignal data are operably connected to a device configured to administer drugs to the patient.

24. A sensor for obtaining biosignal data from a patient, the sensor comprising

- a flexible substrate attachable onto the skin of a patient;
- an electrode array mounted on the flexible substrate, the electrode array comprising a first set of electrodes for obtaining cortex-related signal data from the patient and a second set of electrodes for obtaining subcortex-related biosignal data from the patient, the second set including a first plurality of electrodes for measuring a bioimpedance signal from the patient.

25. A sensor according to claim **24**, wherein at least one electrode of the first plurality of electrodes belongs to the first set of electrodes.

26. A sensor according to claim **24**, wherein the first set of electrodes includes electrodes for obtaining an EEG signal from the patient.

27. A sensor according to claim **25**, wherein the electrode array includes a total of four electrodes of which three belong to the first set and three to the second set.

28. A sensor according to claim **25**, wherein the electrode array includes a total of three electrodes each belonging both to the first and to the second set.

29. A sensor according to claim **24**, wherein the sensor is attachable on the forehead of the patient.